

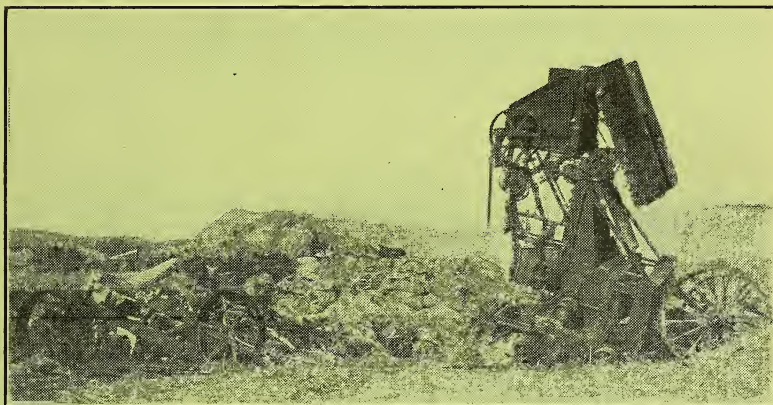
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# EXPLOSIONS AND FIRES IN THRASHING MACHINES CAN BE PREVENTED



This Circular Tells How

U. S. DEPARTMENT OF AGRICULTURE  
WASHINGTON, D. C.  
1918.



## **DON'T LET FOOD GO UP IN SMOKE**

Would you have believed that the loss in grain and machinery through dust explosions and fires in thrashing machines in the wheat-growing section of the Pacific Northwest alone was approximately \$1,500,000 during the years 1914-17? And yet that is a conservative estimate. Allowing each soldier one loaf of bread a day, the grain lost in this way would have fed an army of 2,400,000 men for one month. Just one of these disasters wiped out of existence 3,000 bushels of wheat—enough to have given 270,000 men all the bread required for one day's rations.

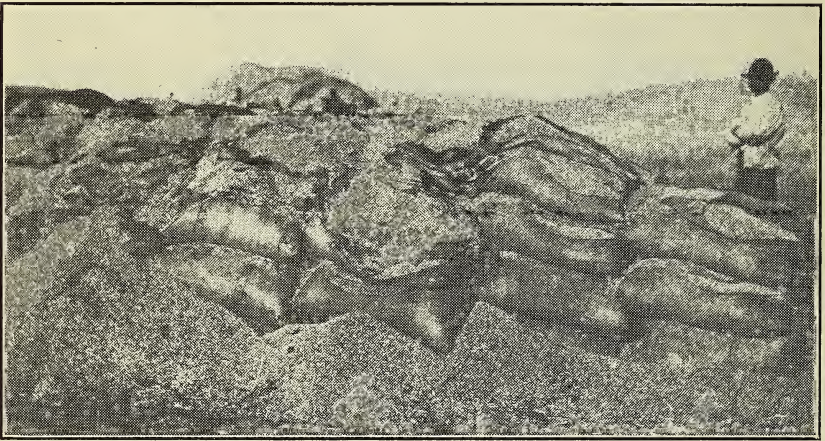
We can't afford to allow such a loss in our wheat supply this season, when the armies across the sea depend on us to help them on their way to victory by sending over the right kind of food. Nor is it worth while for the farmer to increase his wheat acreage only to have the grain he has diligently sowed, cultivated, and harvested swept away by fire.

The Bureau of Chemistry, of the United States Department of Agriculture, through a series of investigations, has determined the causes of these separator dust explosions, and has worked out preventive measures.

**UNCLE SAM HAS DONE HIS PART  
WILL YOU DO YOURS BY HEEDING HIS ADVICE?**

## HOW SEPARATOR EXPLOSIONS AND FIRES OCCUR

While many grain dust explosions and fires have been attributed to the malicious activity of individuals, the real culprit in such disasters usually is Grain Dust, that arch enemy of the thrasher, which has been disregarded too long.



GRAIN BADLY DAMAGED BY A SEPARATOR EXPLOSION.

We have all seen the fine dust suspended in the air in and around the busy thrashing machine, but how many of us have taken this persistent mischief-maker seriously?

Just two conditions are necessary to make these dust particles take fire—a proper mixture of the fine dry dust suspended in air, and sufficient heat, which may be supplied by an electric spark or a flame of some kind. This combination of dust and air, together with sufficient heat, produces an explosion, often followed by a destructive fire in which large quantities of grain are lost. Bear this in mind when you thrash this year, and keep a watchful eye on the dust.



## THE SOURCE OF GRAIN DUSTS

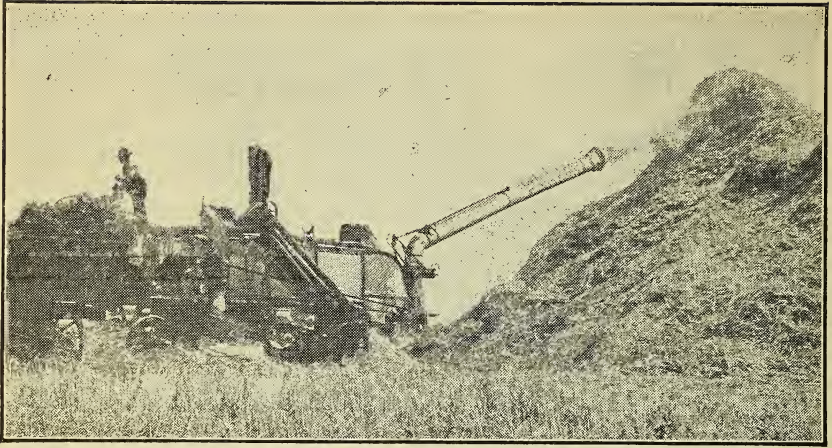
Often these dangerous dusts consist simply of dry particles of chaff and straw. But frequently wheat's old enemy, bunt or "stinking smut," takes a hand in the situation. Not satisfied with being one of the most serious wheat diseases found in this country, causing a loss of over 3,000,000 bushels of wheat in the Pacific Northwest, and a total of 22,000,000 bushels in the whole United States, in 1917 alone, smut continually aggravates the grain dust problem. As found on heads of ripened wheat, it consist of smut "berries" or "balls", containing millions of minute spores or seeds. The healthy kernels of wheat have been replaced by these so-called smut balls. During the process of thrashing many of the smut balls are broken, with the result that the very fine, dry smut dust is thrown into the air.

Of all dust explosions in grain separators those due to smut dust are the worst. Smut dust suspended in the air produces a highly inflammable mixture which readily takes fire upon coming in contact with a spark or a flame. When we stop to consider how easy it is for a flame or spark to be produced in some unexpected way, we must realize the menace lurking behind the cloud of smut dust around our store of grain. Perhaps a match has been carelessly dropped in one of the grain bundles, or a piece of flint, metal, or other foreign material passing through the separator produces a spark, or it may be that the bearings of the machine have become heated.

## LOOK OUT FOR STATIC ELECTRICITY

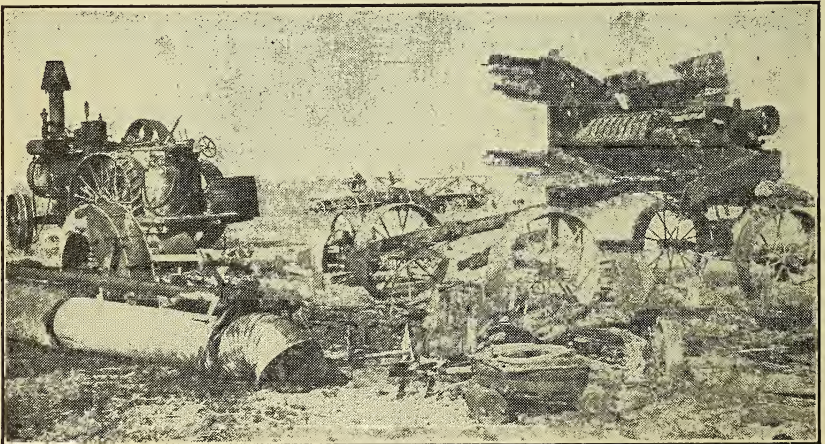
Probably the chief source of ignition in separator grain dust explosions is static or frictional electricity, which is produced in a variety of ways. It may be generated by the friction produced by the rubbing of metallic parts or by the slipping of belts on pulleys, or it may result from the rubbing of grain, straw, and dust against the metallic surfaces of the machine.

Static electricity is a bad companion for grain dust. Since it is impossible to get rid of all the grain dust, obviously some means must be adopted to keep the static electricity well out of the way. This can be accomplished by providing an outlet of escape for this electricity. If the separator is grounded effectively, the charge generated will pass off into the ground as rapidly as it is formed.



**THIS THRASHERMAN USED SAFETY DEVICES.**

The moment it accumulates more rapidly than it can be led away, the grave danger of resulting sparks arises. This danger is especially great on a dry day, when little moisture is present in the atmosphere to serve as a conductor for the surplus static electricity. Unless some means for the escape of this charge to the ground is provided, it may accumulate on the cylinder teeth or other prominent metallic projections in the separator. When no more electricity can be stored at these particular places, it discharges through the air to a nearby point. The resulting sparks, bridging the gap between, ignite the dust suspended in the air, with a resulting explosion and fire which create more or less damage.



**THE OWNER OF THIS MACHINE DID NOT.**

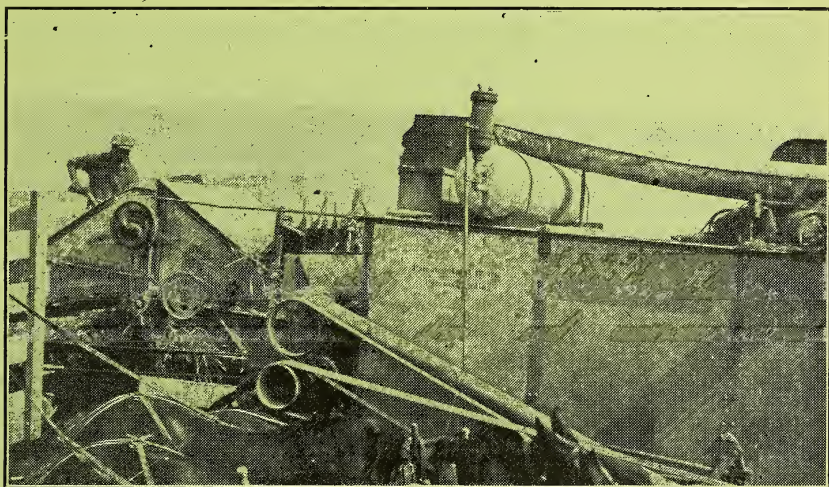


## **\$100 FOR PREVENTION, OR A \$3,000 LOSS?**

Take no chances! Follow the advice of Uncle Sam's experts; reduce to a minimum the chances for an explosion around your machine. These three measures have been tried out in the field and found very effective:

(1) The installation of an effective fire extinguisher, designed for thrashing machines, which, in the event of a fire, not only saves the machine, but prevents the spreading of flames to the nearby grain and straw.

(2) The installation of an exhaust fan to collect and remove smut and dust from the separator, thus preventing the formation of an explosive mixture of dusts.



**A MACHINE EQUIPPED WITH PREVENTIVE DEVICES.**

(3) The installation of an efficient grounding system for the removal of static electricity from the machine.

The fire extinguishers designed for the grain separators effectively extinguish all fires which could not be prevented by the other methods. Should a fire occur in separators wired or equipped with a suction fan, the extinguisher puts it out, thereby affording absolute protection, no matter what the cause may have been. A fire-fighting apparatus which will instantly spray the entire interior of the separator is an essential part of the equipment of the thrasherman anxious to save his property and release for the use of our Army abroad a sufficient supply of grain.

**MR. THRASHERMAN:**  
**Your Country Can Not Afford to Lose Grain**  
**You Can Not Afford to Lose Your Machinery**

**Are you doing your part?**

1. By installing some approved type of fire extinguisher.
2. By installing an exhaust fan.
3. By wiring your separator.
4. By taking every precaution to guard against fires.

If you wish further information concerning details of the modern preventive measures, write to the Bureau of Chemistry, United States Department of Agriculture, Washington, D. C.



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